CLAIMS

What is claimed is

1. A thermal interface material, comprising:
a binder material; and
a fusible filler.

2. The thermal interface material of claim 1, further comprising a non-fusible particle filler.

3. The material of claim 2, wherein the fusible filler is pre-coated onto the non-fusible particle filler prior to addition into the binder material.

4. The material of claim 1, wherein the fusible filler is added to the binder material as a powder.

5. The material of claim 1, wherein the thermal conductivity of the non-fusible particle filler is greater than the thermal conductivity of the fusible filler.

6. The material of claim 1, wherein the binder material is a polymer.

7. The material of claim 1, wherein the binder material acts as an adhesive.

8. The material of claim 1, wherein the non-fusible particle filler is selected from the group consisting of glass fiber, graphite fibers, carbon fibers, boron nitride. aluminum oxides, zinc oxide, aluminum, boron nitride, silver, graphite, carbon fibers, diamond, metal coated carbon fiber, and metal coated diamond.

9. The material of claim 1, wherein the fusible filler is a solder alloy.

10. The material of claim 1, wherein the total filler is in the range of approximately 50 - 99% by weight of the total weight of the thermal interface material.

11. The material of claim 1, wherein the fusible filler is 60 – 90% by weight of the total weight of the thermal interface material.

12. The material of claim 1, wherein the non-fusible particle filler is in the range of approximately 5 – 49% by weight of the total weight of the thermal interface material.

13. The material of claim 1, wherein the volume percent of fusible filler to non-fusible particle filler can be in a range of approximately 5 – 100 volume % fusible filler.

14. .The material of claim 1, wherein the volume percent of fusible filler to non-fusible particle filler can be in a range of approximately 10 – 50 volume % fusible filler.

15. The material of claim 1, wherein the fusible filler has a melting temperature of approximately between 100 - 250º C.

16. The material of claim 1, wherein the fusible filler is stable to oxygen at temperatures up to approximately 150º C and relative humidity up to approximately 90%.

17. The material of claim 1, wherein the fusible filler is selected from the group consisting of indium and tin based solders.

18. The material of claim 1, wherein choice of the solder is excluded from the group consisting of lead, cadmium, mercury, antimony and arsenic.

19. The material of claim 1, wherein a diameter for a non-fusible particle can be approximately 25 microns.

20. A thermal interface material, comprising:

a polymer binder;

a non-fusible particle filler; and

a solder coating the particle filler, wherein the non-fusible particle filler has a thermal conductivity greater than a thermal conductivity of the solder coating.

21. The material of claim 20, wherein the non-fusible particle filler is selected from the group consisting of metal, ceramic fibers, graphite fibers, carbon fibers, and boron nitride.

22. The material of claim 20, wherein the solder coating is selected from the group consisting of indium and tin based solders.

23. The material of claim 20, wherein choice of the solder coating is excluded from the group consisting of lead, cadmium, mercury, antimony and arsenic.

24. An assembly, comprising:

a heat sink;

a spreader plate;

a die;

a thermal interface material in between the die and the spreader plate; and the thermal interface material in between the spreader plate and the heat sink, where the thermal interface material comprises a polymer binder and a solder pre-coated onto a non-fusible particle filler.

25. The assembly of claim 24, wherein the non-fusible particle filler has a thermal conductivity greater than a thermal conductivity of the solder pre-coat.